Bull. Hist-Med.,

1938, 6: 649-667.

BIOG.

BERNARD, Claude

22200085080

To preserve health and to cure disease: this has been the problem set for medicine since its very beginning
EXPERIMENTAL MEDICINE

VIEW OF PART OF THE CLAUDE BERNARD EXHIBIT. PLATE I

AN EXHIBIT OF THE WORKS OF CLAUDE BERNARD

GENEVIEVE MILLER
AND
SANFORD V. LARKEY

As one of the features of the First Graduate Week in Medical History which was held at the Institute of the History of Medicine on April 18-23, 1938, an exhibit of the works of Claude Bernard was presented. It was placed in the Exhibition Hall of the Institute where the space of walls and cases both could be utilized. The walls contained pictures and enlarged diagrams taken for the most part from Bernard's own works to illustrate his life and various phases of his activities; large placards explaining Bernard's methods and discoveries accompanied the pictures. The cases contained literature pertaining to the corresponding walls.

Claude Bernard was chosen as the subject of this exhibit because his works illustrate the sort of display which can be prepared with the facilities available in most medical schools. With the exception of some pictures of scenes taken from places associated with Bernard's life, and an autograph letter borrowed for the purpose, most of the articles displayed were Bernard's own published works, either in the form of books or journal articles, and subsequent articles about him. Several rare books which were available in the Welch Medical Library and therefore were exhibited to present the historical background of Bernard's activities, could be represented just as well by the employment of photostatic title pages. Recent literature showing Bernard's influence is easily obtainable. A number of books in this class and also several volumes of the *Compte Rendu des Séances de l'Académie des Sciences* were borrowed from the library of the Peabody Institute.

The exhibit was divided into eight sections, each occupying one wall space and one or more cases. Wall I contained the biography of Claude Bernard, with two cases devoted to objects, pictures and literature illustrating his life. Wall II presented his work on pancreatic digestion and Wall III an explanation of his discovery of the glycogenic function of the liver. Walls IV and V treated of experimental medicine: the first showing the precursors of Bernard

in this field, and the latter the representatives of the various spheres of thought which he influenced. Walls VI and VII demonstrated the work on vasomotor nerves and the actions of poisons, respectively. Wall VIII described his concept of the internal environment and illustrated the apparatus he used in developing it. Walls II to VIII had separate cases with corresponding literature, and one additional case contained eulogies and appreciations.

Pictures of the walls and lists of the contents of the cases are being reproduced here so that more people may have the opportunity to see them. This catalogue should serve also as a small bibliography for a study of Bernard's life and activities. The exhibit does not pretend to include all of Bernard's publications, but to demonstrate his most important contributions to physiology and medicine.

Case I

Biography

Pictures

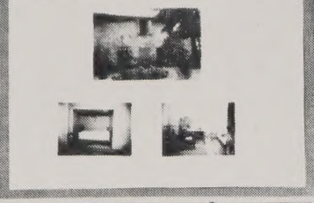
a) Entrance to Bernard's birthplace.
b) View of St. Julien from the back of the farmhouse where Bernard was born.
c) Jesuit college at Villefranche attended by Bernard.
d) Two views of the exterior of Bernard's laboratory at the Collège de France.
[These pictures were the gift of Dr. J. M. D. Olmsted, University of California.]

Medals

a) Ob. Claude Bernard. Clothed bust to right. Signed, A. Borrel, 1879.
Rev. Né a St. Julien (Rhône) le xii juillet mdcccxiii, mort a Paris le x février mdccclxxviii. In wreath, Membre / de l'Académie Franc.^{se} / de l'Académie des Sciences — Professeur / au Collége de France / au Muséum — Comm.^{deur} de la Légion / d'Honneur 67 mm. Bronze.
b) Ob. Claude Bernard. Clothed bust to right. Signed, A. Borrel, 1913. Deschiens édit.

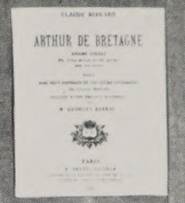
CLAUDE BERNARD ---- 1813--1878

"You have done some pharmacy, study medicine. You have not the temperament of a dramatist"
Saint-Marc Girardin



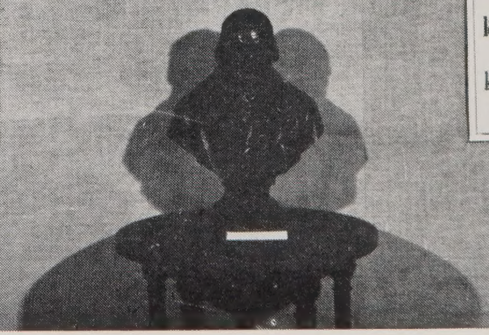
Here in the little village of Saint-Julien near Lyon, Claude Bernard was born on July 12 1813. A typical French son of the soil, he never left France, and returned to his home at every opportunity.

No brilliant student, Bernard gave little indication to his teachers in the ecclesiastical schools of the great scientific career ahead. Later as a pharmacy clerk, he spent most of his time in the theatre. Inspired by the minor success of his musical comedy 'La Rose du Rhone,' he hoped for the acclaim of the larger public of Paris. Fortunately though, the critic, Saint-Marc Girardin, turned his interest to medicine.

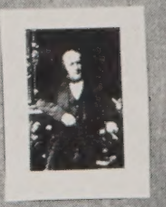


Both Pasteur and Bernard began their careers as artists. Pasteur as a painter and Bernard as a playwright. Later when they were both scientists they aided and encouraged one another.

1834.. Entered the Medical School of Paris.
1841. Assistant to Magendie at the College de France.
1843. M.D. degree with a thesis on the gastric Juice.
1847. Substitute lecturer to Magendie at the College de France.
1854. Professor of Physiology at the Sorbonne.
1855. Succeeded Magendie as Professor of Medicine at the College de France.



1848.. Helped found Societe de Biologie.
1849.. Elected to Legion of Honor.
1854.. Elected to Academie des Sciences.
1868.. Member of the French Academy.
1869.. By Imperial decree appointed to the Senate.



See Cases I—II

Rev. Claude Bernard / né a St Julien (Rhône) / 12 juillet 1813 / mort a Paris / 10 février 1878 — Membre / de l'Académie Française / de l'Académie des Sciences / de l'Académie de Médecine — Professeur / au Collège de France / a la Faculté des Sciences / au Museum d'Histoire Naturelle
75 x 120 mm. White metal.

Claude Bernard, *Arthur de Bretagne. Drame inédit en cinq actes et en prose avec un chant. Publié avec deux portraits et une lettre autographe de Claude Bernard précédé d'une préface historique de M. Georges Barral*, Paris, 1887. [Loaned by Dr. J. M. D. Olmsted, University of California.]

Claude Bernard, *Thèse présentée à la Faculté des Sciences de Paris pour obtenir le Grade de Docteur ès Sciences Naturelles.*

Thèse de Zoologie—Recherches sur une nouvelle fonction du foie, considéré comme organe producteur de matière sucrée chez l'homme et les animaux.

Thèse de Zoologie—Propositions de botanique, de Géologie, d'Anatomie et de Physiologie, données par la Faculté. Paris, 1853.

Bernard's First Published Paper

"Recherches anatomiques et physiologiques sur la corde du tympan, pour servir à l'histoire de l'hémiplégie faciale." *Annales Médico-Psychologiques*, T. I, 1843, pp. 408-439.

Notebook of One of Bernard's Students

F. Donaldson, *Cours de M. Bernard sur la Physiologie Expérimentale et Médicale*, Paris, Dec. 1849. (Manuscript.)

Walter F. Atlee, M. D., *Notes of M. Bernard's Lectures on the Blood*, Philadelphia, 1854.

This was the first publication of any of Bernard's lectures.

Bound Collection of Reprints from Bernard's Library

[Loaned by Dr. J. M. D. Olmsted, University of California.]

Autographs

a) Copy of Claude Bernard, *Rapport sur les Progrès et la Marche*

de la Physiologie Générale en France, Paris, 1867, with the autograph "A Monsieur Paul Janet hommage affectueux de ton confrère Claude Bernard." [Loaned by Dr. Philip Bard, The Johns Hopkins Medical School.]

b) Letter dated from Nantes, August 21, 1875 (addressee unknown). [Loaned by Dr. J. M. D. Olmsted, University of California.]

Case II

Biography

A. Ferrand, *Claude Bernard et la Science Contemporaine*, Paris, 1879.

M. Jousset de Bellesme, "Notes et Souvenirs sur Claude Bernard." *Revue Internationale des Sciences*, T. X, No. 5, 1882, pp. 433-451.

Michael Foster, *Claude Bernard*, New York, 1899.

Jean Louis Faure, *Claude Bernard*, Paris, 1925.

J. F. Fulton, "Claude Bernard and the Future of Medicine." *The Canadian Medical Association Journal*, Vol. XXVII, 1932, pp. 427-433.

J. M. D. Olmsted, "The Influence of Claude Bernard on Medicine in the United States and England." *California and Western Medicine*, Vol. 42, No. 2, Feb. 1935; Vol. 42, No. 3, Mar. 1935.

———, "Claude Bernard as a Dramatist." *Annals of Medical History*, New Series, Vol. 7, 1935, No. 3, pp. 253-260.

———, "The Contemplative Works of Claude Bernard." *Bulletin of the Institute of the History of Medicine*, Vol. III, No. 5, May 1935, pp. 335-354.

———, "Claude Bernard's Posthumously Published Attack on Pasteur and Pasteur's Defense." *Annals of Medical History*, New Series, Vol. 9, March 1937, pp. 114-124.

———, *Claude Bernard, Physiologist*, New York and London, 1938.

PANCREATIC DIGESTION

"Experimental ideas are often born by chance, with the help of some casual observation"

Although De Graaf in 1664 had demonstrated pancreatic and biliary secretions, little was known of their true function until the time of Bernard.

Bernard's work on the pancreas started with a chance observation that the urine of some rabbits, brought from the market, was clear and acid, contrary to what was usually found. This led Bernard to the conclusion that all fasting animals feed on meat.

While studying this, he noticed that the lacteal vessels were engorged with fat just below the entrance of the duodenal duct. This led him to conclude that the pancreatic juice played a part in the digestion of fats and further experiments demonstrated its action.

See Case III

WALL II. PLATE III

Case III

Pancreatic Digestion

Gaspar Aselli, *De Lactibus*, Milan, 1627.

Aselli was the first to describe the lacteal vessels.

Regner de Graaf, *De Succi Pancreatici Natura et Usu* (first published in 1664) in *Opera Omnia*, Leyden, 1677.

Faculté de Médecine de Paris, Thèse pour le Doctorat en Médecine, présentée et soutenue le 7 décembre 1843, par Claude Bernard, *Du Suc Gastrique et de son Rôle dans la Nutrition*, Paris, 1843.

Claude Bernard, "Du suc pancréatique et de son rôle dans les phénomènes de la digestion." *Mémoires de la Societé de Biologie*, 1849, pp. 99-115.

Claude Bernard, *Mémoire sur le Pancréas et sur le Rôle du Suc Pancréatique dans les Phénomènes Digestifs, Particulièrement dans la Digestion des Matières Grasses Neutres*, Paris, 1856. [Loaned by Dr. J. M. D. Olmsted, University of California.]

Claude Bernard, *Introduction à l'Étude de la Médecine Expérimentale*, Paris, 1865, p. 266.

Here Bernard tells how he came to begin his studies of pancreatic digestion.

Claude Bernard, *Leçons de Physiologie Expérimentale*, T. II, Paris, 1856, p. 170.

Septième Leçon
23 Mai 1855

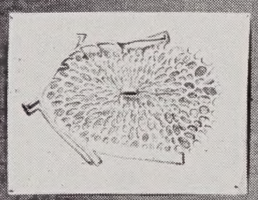
Sommaire: Rapprochement du pancréas avec les glandes salivaires. — Historique des travaux sur le pancréas, dans lesquels se retrouve cette confusion du pancréas et des glandes salivaires. — État des connaissances sur les fonctions du pancréas avant nos recherches. — Du suc pancréatique, des procédés employés pour l'obtenir: procédés de de Graaf, de Magendie, de Tiedemann et Gmelin, de Leuret et Lassaigne. — Par quelles circonstances nous avons été amené à faire des expériences sur le pancréas.

GLYCOGENIC FUNCTION OF THE LIVER

On 1843, in one of my first pieces of work, I undertook to study what becomes of different alimentary substances in nutrition ....."

Before Bernard, it was believed that in contrast to plants, animals could not synthesize organic substances within the body. This was the view expounded by Dumas, the teacher of Pasteur.

Bernard was interested in what became of sugar in the body. The blood of all animals contains sugar even when they do not eat it". Where does this constant supply of sugar in the blood come from? After many experiments he showed that there was an organ in the body, the liver, which instead of destroying sugar, manufactured it from the glycogen stored there. This furnished a constant supply of glucose to the blood in the form of an 'internal secretion' [the first use of this term.]



Cross section of liver showing hepatic and portal veins

Schematic diagram of vascular system

This fundamental work of Bernard which overthrew the old ideas is the starting point of modern conceptions of metabolism, of endocrinology, and of our understanding of diabetes.

See Case IV

WALL III. PLATE IV

Case IV

Glycogenic Function of the Liver

Dumas et Boussingault, *Essai de Statique Chimique des Êtres Organisés, Troisième Édition,* Paris, 1844.

Dumas and Boussingault followed the prevailing theory that plants alone are capable of synthesizing sugar.

Claude Bernard, " Sur une nouvelle fonction du foie chez l'homme et les animaux." *Compte Rendu des Séances de l'Académie des Sciences,* 31, 1850, pp. 571-574.

Here Bernard published the proof that sugar is produced in the liver of animals.

Claude Bernard, *Nouvelle Fonction du Foie Considéré comme Organe Producteur de Matière Sucrée chez l'Homme et les Animaux,* Paris, 1853.

Claude Bernard, " Sur le mécanisme de la formation du sucre dans le foie." *Comp. rend. Acad. d. Sc.,* 1855, pp. 461-469.

Claude Bernard, *Leçons de Physiologie Expérimentale,* Paris, 1855, pp. 96-97.

The first appearance of the words *sécrétions internes*:

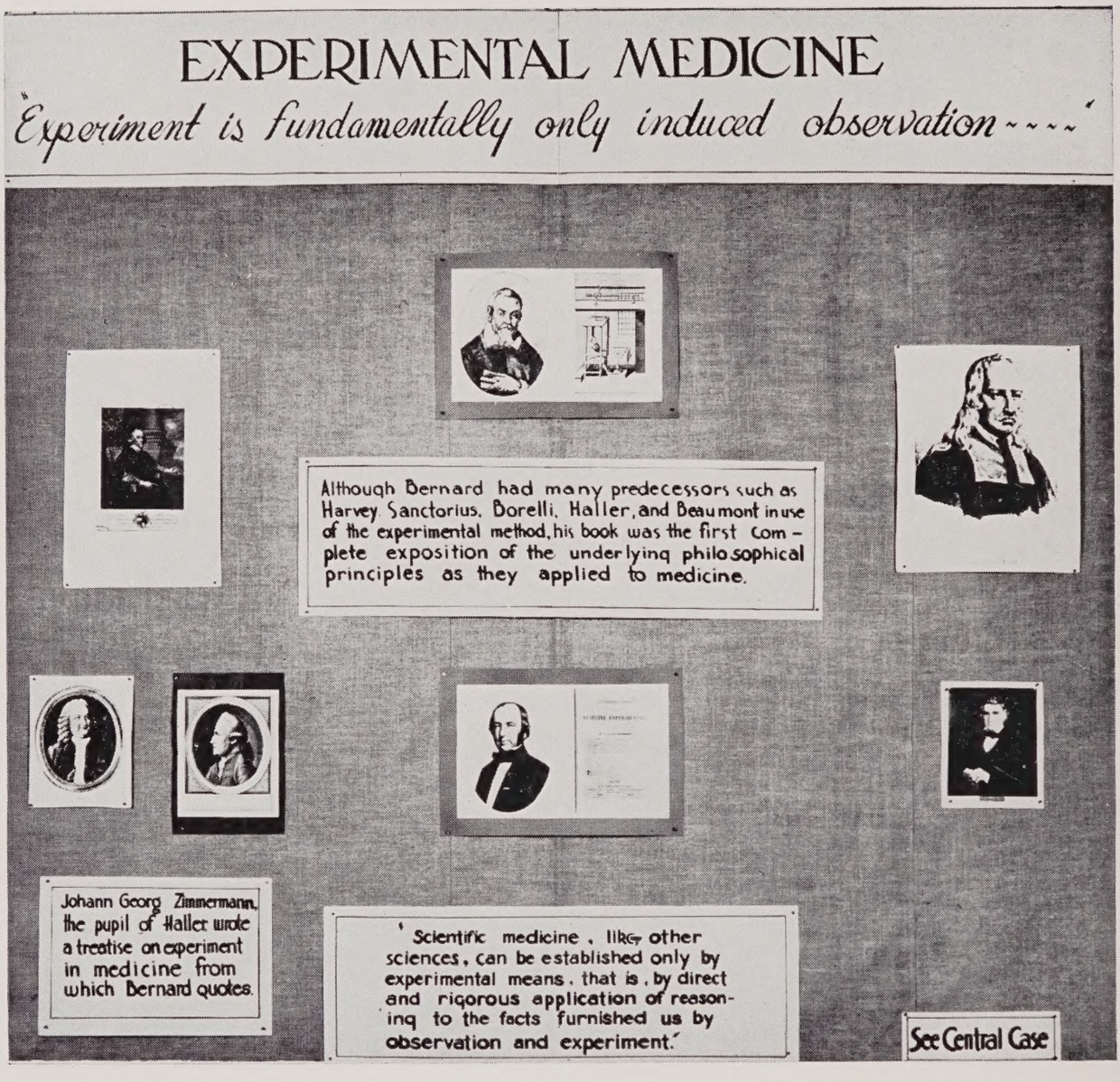
" L'histoire du foie établit maintenant d'une manière très-nette qu'il y a des *sécrétions* internes, c'est-à-dire des sécrétions dont le produit, au lieu d'être déversé à l'extérieur est transmis directement dans le sang."

Claude Bernard, " Remarques sur la formation de la matière glycogène du foie." *Comp. rend. Acad. d. Sc.,* 44, 1857, pp. 1325-1331.

Directions for preparing pure glycogen.

Claude Bernard, *Leçons sur le Diabète et la Glycongenèse Animale,* Paris, 1877.

Frank G. Young, " Claude Bernard and the Theory of the Glycogenic Function of the Liver." *Annals of Science,* Vol. 2, No. 1, Jan. 1937, pp. 47-83.


EXPERIMENTAL MEDICINE
"Experiment is fundamentally only induced observation----"
Although Bernard had many predecessors such as Harvey Sanctorius, Borelli, Haller, and Beaumont in use of the experimental method, his book was the first complete exposition of the underlying philosophical principles as they applied to medicine.
Johann Georg Zimmermann, the pupil of Haller wrote a treatise on experiment in medicine from which Bernard quotes.
"Scientific medicine, like other sciences, can be established only by experimental means, that is, by direct and rigorous application of reasoning to the facts furnished us by observation and experiment."
See Central Case

WALL IV. PLATE V

Central Case

Experimental Medicine

Claude Bernard, *Introduction à l'Étude de la Médecine Expérimentale*, Paris, 1865.

Claude Bernard, *Introduction à l'Étude de la Médecine Expérimentale*, Paris, 1930.

Claude Bernard, *An Introduction to the Study of Experimental Medicine.* Translated by Henry Copley Greene, with an Introduction by Lawrence J. Henderson, New York, 1927.

Pierre Lamy, *L'Introduction à l'Étude de la Médecine Expérimentale. Claude Bernard, le Naturalisme et le Positivisme*, Paris, 1928.

Precursors

William Harvey, *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*, Frankfort, 1628.

Santorio Santorio, *De Statica Medicina Aphorismorum. Sectiones Septem: cum Commentario Martini Lister*, London, 1701.

Medicina Statica: being the Aphorisms of Sanctorius. Translated into English with large Explanations. The Second Edition, London, 1720.

Io. Alphonsi Borelli, *De Motu Animalium*, Rome, 1681.

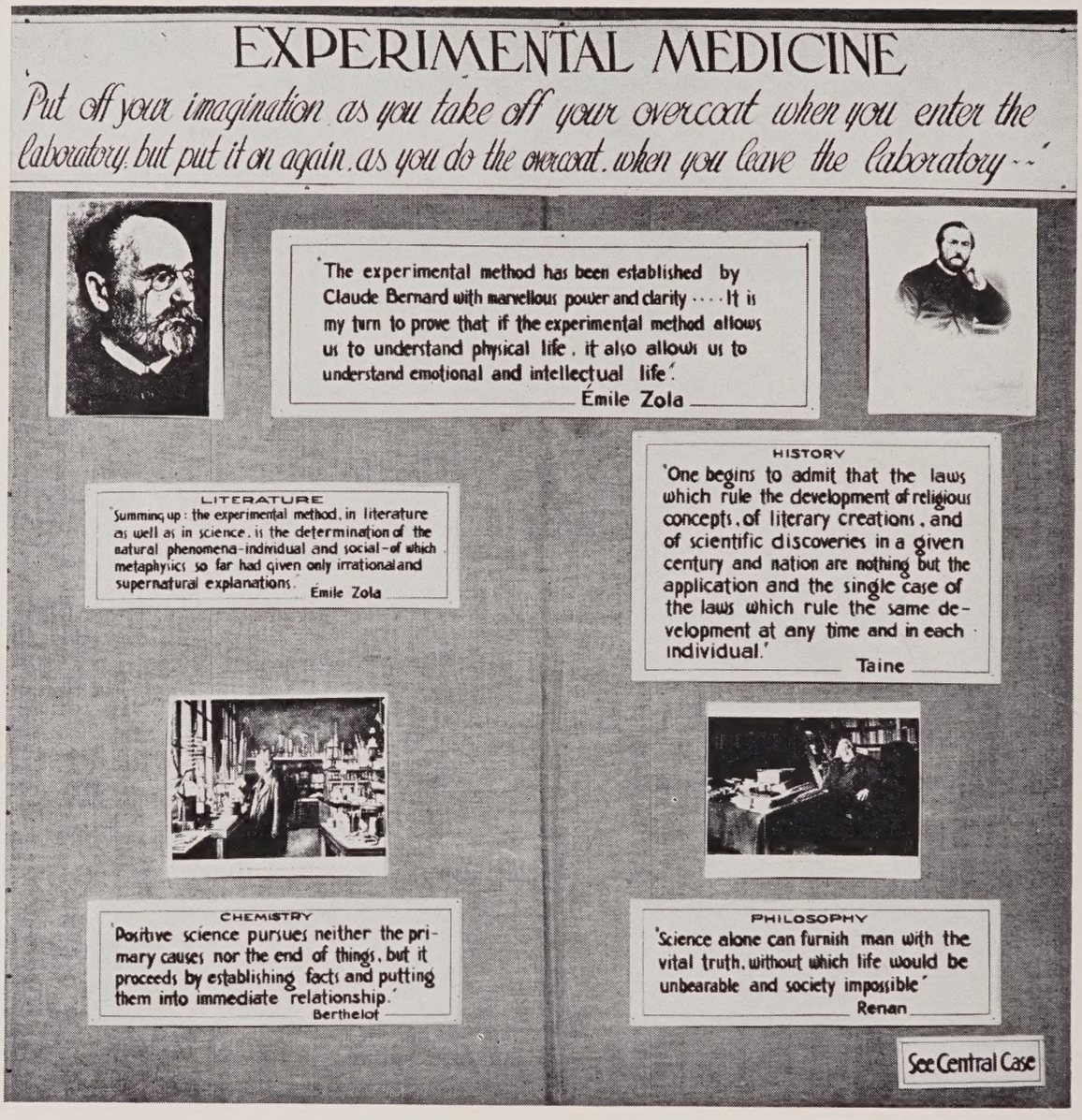
Albrecht von Haller, *Elementa Physiologiae Corporis Humani.* Tomus Primus, Lausanne, 1757.

William Beaumont, *Experiments and Observations on the Gastric Juice and the Physiology of Digestion*, Boston, 1834.

Claude Bernard, *Leçons de Physiologie Expérimentale Appliquée à la Médecine*, T. II, Paris, 1856, pp. 382-383.

Bernard discusses Beaumont's work and reproduces several of his illustrations of the gastric fistula.

Johann Georg Zimmermann, *Von der Erfahrung in der Arzneykunst*, Zürich, 1787.


EXPERIMENTAL MEDICINE
'Put off your imagination as you take off your overcoat when you enter the laboratory, but put it on again, as you do the overcoat, when you leave the laboratory.'
'The experimental method has been established by Claude Bernard with marvellous power and clarity .... It is my turn to prove that if the experimental method allows us to understand physical life, it also allows us to understand emotional and intellectual life'.
Émile Zola
LITERATURE
'Summing up: the experimental method, in literature as well as in science, is the determination of the natural phenomena-individual and social-of which metaphysics so far had given only irrational and supernatural explanations.'
Émile Zola
HISTORY
'One begins to admit that the laws which rule the development of religious concepts, of literary creations, and of scientific discoveries in a given century and nation are nothing but the application and the single case of the laws which rule the same development at any time and in each individual.'
Taine
CHEMISTRY
'Positive science pursues neither the primary causes nor the end of things, but it proceeds by establishing facts and putting them into immediate relationship.'
Berthelot
PHILOSOPHY
'Science alone can furnish man with the vital truth, without which life would be unbearable and society impossible'
Renan
See Central Case

WALL V. PLATE VI

Johann Georg Zimmermann, *A Treatise on Experience in Physic*, Vol. I, London, 1782.

Influence in Other Fields

Émile Zola, *Le Roman Expérimental*, Paris, 1923.

H. Taine, *De l'Intelligence*, T. I, Paris, 1870.

H. Taine, *Les Origines de la France Contemporaine*, T. I, Paris, 1906.

M. Berthelot, *Leçons sur les Méthodes Générales de Synthèse en Chimie Organique*, Paris, 1864.

M. Berthelot, *Introduction à l'Étude de la Chimie des Anciens et du Moyen Age*, Paris, 1889.

M. Berthelot, *Science et Libre Pensée*, Paris, 1905.

Ernest Renan, *L'Avenir de la Science, Pensées de 1848*, Paris, 1849.

Ernest Renan, *Questions Contemporaines*, Paris, 1868.

Ernest Renan, *Dialogues et Fragments Philosophiques*, Paris [n. d.].

CASE V

Vasomotor Nerves

Claude Bernard, "De l'influence du système nerveux grand sympathique sur la chaleur animale." *Comp. rend. Acad. d. Sc.*, 34, 1852, pp. 472-478.

Claude Bernard, "Sur les effets de la section de la portion céphalique du grand sympathique." *Mém. Soc. de Biologie*, 1852, pp. 168-170.

Brown-Séquard, "Experimental Researches applied to Physiology and Pathology." *Medical Examiner*, Philadelphia, 1852, Vol. VIII, New Series, pp. 481-504.

Brown-Séquard had observed the action of the sympathetics in relation to vasodilatation independently of Bernard.

Claude Bernard, "Recherches expérimentales sur le grand sympathique et spécialement sur l'influence que la section de ce nerf

VASOMOTOR NERVES

Today my experiments on the vascular and thermo-regulatory nerves have opened a new path for investigation . . .

Illustration of the cutting of the fifth cranial nerve

Temperature changes in paralysis led Bernard to feel that cutting of the sympathetic nerves would lower the temperature of the part. Experiment showed the exact opposite. So abandoning his old hypothesis, he continued his studies on the basis of these new facts.

Bernard demonstrating Stimulation of vasomotor nerves

Stimulation experiments produced results opposite from cutting. By extending his technique he showed the existence of the two types of vasomotor nerves, vasoconstrictor and vasodilator. This discovery was of inestimable value to the study of the blood supply.

See Case V

WALL VI. PLATE VII

exerce sur la chaleur animale; lues à la Société de Biologie, dans les séances des 7 et 21 décembre 1853." *Mém. Soc. de Biologie*, 1853, pp. 77-107.

Claude Bernard, " Sur l'influence qu'exercent différents nerfs sur la sécrétion de la salive." *Compte Rendu des Séances de la Société de Biologie*, Juillet 1857, pp. 85-86.

Claude Bernard, " De l'influence de deux ordres de nerfs qui déterminent les variations de couleur du sang veineux dans les organes glandulaires." *Comp. rend. Acad. d. Sc.*, 9 Août 1858, pp. 245-253.

Claude Bernard, *Leçons sur la Chaleur Animale sur les Effets de la Chaleur et sur la Fièvre*, Paris, 1876.

Case VI

Actions of Poisons

Claude Bernard, *Leçons sur les Effets des Substances Toxiques et Médicamenteuses*, Paris, 1857.

Claude Bernard, *Leçons sur les Effets des Substances Toxiques et Médicamenteuses*, Paris, 1857, p. 353.

The final proof of the independent excitability of muscle by experiments with curare:

" Quelles que soient les réflexions que ce fait peut faire naître, il n'en est pas moins bien établi que le *curare agit sur le système nerveux moteur et sur lui seul.*

D'où l'on doit nécessairement conclure:

1. *Que la contractilité du système musculaire est indépendante du système nerveux;*

2. *Que les nerfs moteurs peuvent être lésés sans que les nerfs sensitifs soient.*"

Claude Bernard, *Leçons sur les Propriétés des Tissus Vivants*, Paris, 1866, pp. 61-118.

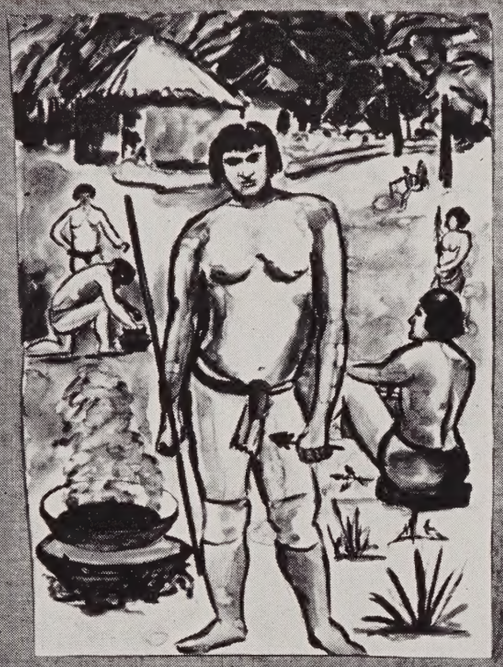
History of the theory of irritability.

Claude Bernard, *Rapport sur les Progrès et la Marche de la Physiologie Générale en France*, Paris, 1867, p. 186.

Bernard showed that oxygen is held in a combined state in the blood by injecting pyrogallic acid into the blood stream.

ACTIONS OF POISONS

All medicines are, after all, poisons ...



Having been given some South American Indian arrows tipped with the poison curare. Bernard became very much interested in the action of this drug. His experiments with this poison, which paralyzes only the motor nerves, furnished the final proof of the independent excitability of muscle.

His work on carbon monoxide poisoning led to an important contribution to the knowledge of the function of the red blood corpuscles.

See Case VI

WALL VII. PLATE VIII

Claude Bernard, *Leçons sur les Effets des Substances Toxiques et Médicamenteuses*, Paris, 1857, pp. 179-190.

Blood saturated with carbon monoxide will not take up oxygen: "Sommaire: Le sang devient rutilant au contact de l'oxyde de carbone et cette coloration persiste. — L'oxyde de carbone tue et empêche le sang arteriel de devenir veineux: il paralyse les globules et met obstacle aux échanges gazeux dont ils sont les agents. — Théories par lesquelles on a cherché à expliquer les effets de ce gaz."

Felix Hoppe-Seyler, "Ueber die chemischen und optischen Eigenschaften des Blutfarbstoffs, Zweite Mittheilung." *Virchows Arch. f. path. Anat.*, 29, 1864, pp. 233-235.

Hoppe-Seyler in 1864 suggested the term hemoglobin for the red coloring matter of the blood.

Case VII

The Internal Environment

Claude Bernard, *Leçons sur la Chaleur Animale*, Paris, 1876.

Claude Bernard, *Leçons sur les Phénomènes de la Vie Communs aux Animaux et aux Végétaux*, T. I, Paris, 1878, p. 113.

"La fixité du milieu intérieur est la condition de la vie libre, indépendante."

John F. Fulton, *Selected Readings in the History of Physiology*, Baltimore, 1930, pp. 307-309.

Translation of Bernard's simple description of the *milieu intérieur* from his *Leçons sur les Phénomènes de la Vie Communs aux Animaux et aux Végétaux*, Paris, 1878, T. I, pp. 67, 111-114, 123-124.

J. S. Haldane, *The Philosophical Basis of Biology*, Hodder and Stoughton, Ltd., 1931, p. 73.

Joseph Barcroft, *Features in the Architecture of Physiological Function*, Cambridge, 1934, p. 1.

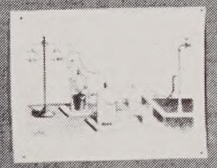
Walter B. Cannon, *The Wisdom of the Body*, New York, 1932, p. 37.

Lawrence J. Henderson, *Blood, a Study in General Physiology*, New Haven, 1928, p. 3.

The INTERNAL ENVIRONMENT

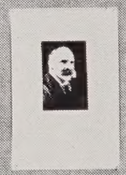
"The stability of the internal environment is the primary condition for freedom and independence of existence"

Apparatus used by Bernard in studying the elements of the internal environment: Water, Oxygen, heat and reserve chemical substances'



'I think I was the first to urge the belief that animals have really two environments: a 'milieu extérieur' in which the organism is situated, and a 'milieu intérieur' in which the tissue elements live. The living organism does not really exist in the 'milieu extérieur' (the atmosphere if it breathes, salt or fresh water if that is its element) but in the liquid 'milieu intérieur' formed by the circulating organic liquid which surrounds and bathes all the tissue elements, this is the lymph or plasma, the liquid part of the blood which, in the higher animals, is diffused through the tissues and forms the ensemble of the intercellular liquids and is the basis of all local nutrition and the common factor of all elementary exchanges.'

Haldane, Barcroft Cannon, and ···· Henderson have extended these ideas of Bernard in the field of physiology



'To sum up, if we wish to find the exact conditions of vital manifestations in man and the higher animals, we must really look, not at the outer cosmic environment, but rather at the inner organic environment.'

See Case VII

Case VIII

Eulogies

"Académie des Sciences. Discours de M. Vulpian, Membre de l'Académie des Sciences, aux Funérailles de M. Claude Bernard le 16 Février 1878." Claude Bernard, *Leçons sur les Phénomènes de la Vie Communs aux Animaux et aux Végétaux*, T. I, Paris, 1878, pp. vii-xxv.

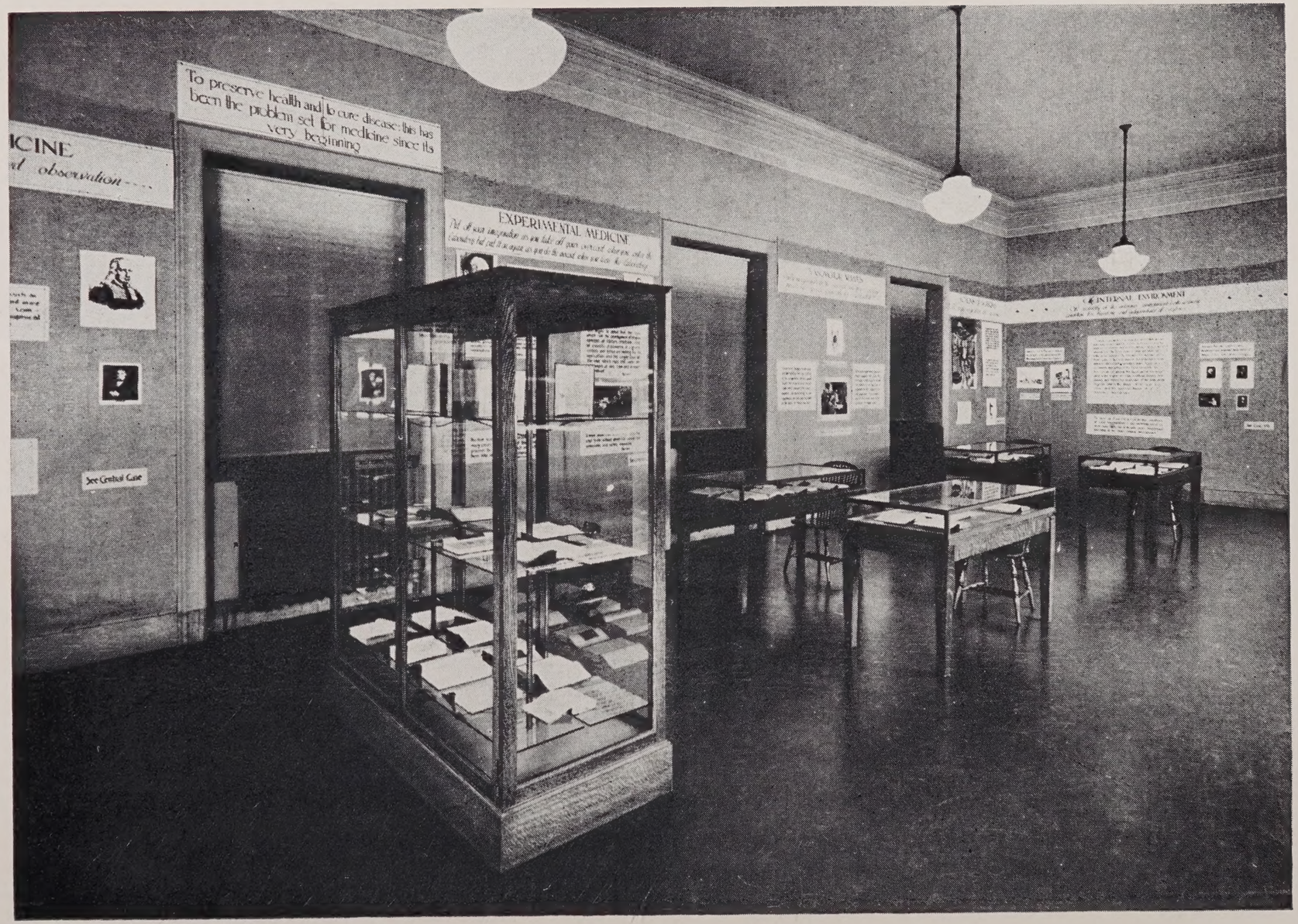
" Faculté des Sciences de Paris. Discours de M. Paul Bert, Professeur à la Faculté des Sciences, aux Funérailles de M. Claude Bernard le 16 Février 1878." Claude Bernard, *Leçons sur les Phénomènes de la Vie Communs aux Animaux et aux Végétaux*, T. I, Paris, 1878, pp. xxvi-xxxii.

E. Renan, Claude Bernard. *L'Oeuvre de Claude Bernard*, Paris, 1881, pp. 3-37.

M. J. Béclard, *Éloge de Claude Bernard.*

Paul Bert, Les Travaux de Claude Bernard. *L'Oeuvre de Claude Bernard*, Paris, 1881, pp. 39-87.

M. Dumas, Discours aux Funérailles de M. Claude Bernard le 16 Février 1878. Claude Bernard, *La Science Expérimentale*, Paris, 1878, pp. 5-13.


To preserve health and to cure disease: this has been the problem set for medicine since its very beginning
EXPERIMENTAL MEDICINE
See Central Case

VIEW OF PART OF THE CLAUDE BERNARD EXHIBIT. PLATE X